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HEPATICÆ BOLIVIANÆ,

IN ANDIBUS BOLIVIÆ ORIENTALIS, ANNIS 1885-6,  
A CL. H. H. RUSBY LECTÆ.

BY RICHARD SPRUCE, Coneysthoipe, England.

The small collection of Hepaticæ made by Dr. Rusby on the eastern slope of the Bolivian Andes is an interesting addition to our scanty knowledge of the Cryptogamia of that region. It serves also for comparison with what we know of the hepatic flora of the Peruvian and Quitenian (equatorial) Andes, investigated by myself; of the Andes of New Granada, by Lindig and others; and of Mexico mainly by Liebmann. One curious fact brought out by that comparison is the greater correspondence of the hepatic flora of Bolivia with that of Mexico than with that of the equatorial regions (lat.  $0^{\circ}$ — $7^{\circ}$  S.) personally known to me. The climate and other conditions of growth in Mexico, a little within the northern tropic, may be more nearly conformable to those of Bolivia, in proximity to the southern tropic, than in the intervening portions of the Cordilleras. Anyhow, many of the hepatics of the highlands of Mexico are identical with those collected by Dr. Rusby at nearly the same altitude in Bolivia, and some of them were nowhere seen by myself near the equator. Of *Plagiochila*, for instance, at least three Mexican species which I did not gather in the Andes are proved to belong also in Bolivia; and two other Bolivian species which I suppose to be new have in Mexico their two nearest allies, neither of which is known to exist near the equator. *Lepicolea ochroleuca*, N. (*Sendtnera*, Syn. Hep.), a large and showy hepatic, grows rarely from Mexi-

co to the Falkland Isles, and now Bolivia is intercalated in its range; yet I never fell in with it. Fewer Bolivian species than might be predicated are identical with those of Chili or of South Brazil, but further researches may add to their number.

In the following catalogue the genera stand in nearly the same order as in my 'Hepaticæ Amazonicæ et Andinæ,' and I add a few prefatory remarks on some of the more notable genera and species.

A peculiar feature in the hepatic vegetation of Bolivia seems to be the paucity of species of *Frullania*, as contrasted with their great abundance and variety in the Equatorial Andes. They are such conspicuous plants, from their habit of forming large, shining, reddish-brown or lurid-purple patches on trees and rocks, that, if existent, they could not have been overlooked. Yet one species must have occurred in some quantity, as it forms the bulk of three of Dr. Rusby's packets; it is also new (*F. Boliviana*, n. sp.) and differs from its nearest ally, *F. tetraptera*, Mont., in the dioicous inflorescence and other important characters specified below. *F. tetraptera* was discovered by d'Orbigny in Chili, and a small fertile specimen has been picked out of Dr. Rusby's Sorata collections by Mrs. Britton. The remaining species are all in small quantity, but comprise some novelties, which will be described in their place.

The headquarters of the vast genus *Lejeunea* is in the hot, damp forests of equatorial plains. In the Quitoian Andes there is a considerable falling off in the number of species when we ascend above 4,000 feet, which is Dr. Rusby's lowest limit for hepatics in the Bolivian Andes. Three of his *Lejeunea* are in considerable quantity: *L. (Omphalanthus) filiformis* (Sw.); *L. (Taxilejeunea) isocalycina*, in broad, milk-white patches, rarely fertile; and a *Ceratolejeunea* which I have called *L. fastigiata*, n. sp., from the long, sub-simple stems growing in closely-packed bundles. Tropical ferns afford a prolific nidus for the minuter *Lejeuneæ*. On an *Acrostichum* gathered by Dr. Rusby grow, besides an undescribed *Radula*, some half dozen *Lejeuneæ*. One of these, *Ceratolejeunea malleigera*, n. sp., is the gem of the collection. It is abundantly fertile, and its most striking peculiarity is in the perianth being produced upward into two mallet-like



horns, that remind one of the antennæ of some tropical moths. *Lopholejeunea Rusbyi*, n. sp., is one of the larger species, and is fortunately in perfect state. Like its congeners it has the keels of the perianth bordered by a broad toothed wing, but in the acuminate serrated leaves it differs from all others. Most of the remaining *Lejeunea* are parasitic on other hepatics, and (with the exception of *L. denticulata*) are in small quantity—some indeed so scanty and imperfect that I do not venture to name them. Of those I recognize, the majority extend through tropical America to the Antilles and Mexico.

*Radulæ* are few and in small quantity, but include two new and very interesting species, and (what I was particularly pleased to see) good specimens, though sterile, of the true *R. Xalapensis*, Mont., which was so-named by Montagne from a site called Xalapa on the eastern side of Bolivia, and not from the famed Mexican city. *Radulæ*, like *Lejeuneæ*, are apt to grow much mixed up, and it was doubtless a specimen of *R. ramulina*, Tayl. which Gottsche received from Montagne under the name "*R. Xalapensis*" (having lurked undistinguished in the same tuft with the true plant) and described as such in "Mexikanske Levermosser." A stem or two of *R. ramulina* occurs attached to several of Dr. Rusby's *Plagiochilæ*: it is well distinguished from *R. Xalapensis* by its larger size, and especially by the abnormally large and overlapping lobule, in which it closely approaches the Irish *R. voluta*, Tayl.

*Scapania Portoricensis*, Gottsch. This, the only tropical American species of its genus known to me, and certainly one of the noblest, was gathered by myself in perfect fruit, growing on wax-palms in the forest of Canelos (June, 1857) and named in my MS. *Scapania splendida*, but not published until 1885. I did not even at the latter date know of the existence of a memoir on the Hepaticæ of Porto Rico, by M. M. Hampe and Gottsche, published so long ago as 1853, in which the same *Scapania* is described, but from barren specimens, and with the erroneous character of a quite entire lobule. Dr. Rusby gathered in Bolivia a single very fine plant of it, and I have picked fragments of the same off some of his other hepaticæ; but in these, as in others in Porto Rico and Jamaica (*Scap. grandis*, Bosw. in Journ.

Bot.) and in my own from Ecuador, the lobule is invariably finely toothed all round.

*Isotachis serrulata*, Sw., is one of the most conspicuous of hepaticæ from its size, its purple or blood-red color, and its habit of forming wide, dense patches, rarely with any admixture of other species. It is well represented in Dr. Rusby's collection, and we have it also from south Brazil and the Antilles, yet I was never fortunate enough to fall in with it.

The solitary species of *Herberta* (= *Sendtnera*, Syn.) differs from all others known to me by the serrated lacinia of its deeply bifid leaves.

*Bazzania* is represented by four species, three of which have been previously found in Chili, New Granada, etc. *B. Rusbyi*, n. sp. is a very pretty species, notable for its pellucid foliage, its underleaves sharply spinuloso-dentate, etc. The Mexican *B. denticulata*, L. et G. is possibly its nearest congener, but is smaller, more opaque, and the underleaves are much less toothed, especially at the sides. In a genus where the numerous species are separated by such minute characters, two equally conscientious observers will often differ as to which are species and which varieties.

Of the five *Lepidozia* in the collection, two exist in some quantity, and were probably abundant. The one is *L. plumæformis*, nob. in Rév. Bryol. (1887) previously known to us only from scanty specimens gathered in south Brazil by Glaziou; the other is the widely-distributed *L. cupressina* (Sw.), which (as *L. tumidula*, Tayl.) extends as far north as the British Isles. A third *Lepidozia*, of which there are but few specimens, is a variety of *L. truncatella*, Nees, whereof the type is south African. Although the identity of an African with an American hepatic is to be admitted with caution, we have a few undoubted examples of such, e. g. *Lejeunea trifaria*, N. and *L. Sagraeana*, Mont.

*Plagiochilæ* constitute the bulk of Dr. Rusby's collection. They are in greatest variety in the sections Spinulosæ and Fron-descentes, and they include a fair share of novelty. A *Plagiochila* near the common *P. asplenoides* of the north temperate zone, yet well distinguished, is the *P. alternans* of Gottsche, still known only in barren state. Although Dr. Rusby's specimens

extend its range from Mexico to Bolivia, and Mrs. Britton sends me the same, gathered by Mr. Hyde in Costa Rica, I never met with it in so much of the intervening space as I traversed.

In contrast with the abundance and variety of the *Plagiochilæ* *Grandifoliæ* in the Quitenian Andes is their paucity in Bolivia, only two species being clearly distinguishable. Yet one of these, *P. Notarisii*, notable for its large, flattish, semi-cordate, paucidentate leaves, seen by me in small quantity only in the valley of the Pastasa, has been gathered abundantly by Dr. Rusby.

Of the numerous species of the section *Cristatæ* I gathered in Amazonian and Andine forests Dr. Rusby's collection includes not one; but it has two other species, quite distinct from any of mine, whereof one had been previously discovered in Bolivia by d'Orbigny. The other (*P. Boliviana*, n. sp.), which I suppose to be new, comes very near the *P. punctualis*, G., found by Liebman in Mexico.

*Lophocoleæ*, with a single exception, are exceedingly rare. Of the sections *Bidentatæ* and *Bicornutæ*, so abundant in equatorial forests, fragments only of one, or possibly two species have been seen. But one other species, notable for its oblong-hexagonal leaves, with a ciliiform tooth at each of the four free angles (whence my name, *L. 4-dentata*, n. sp.) must have abounded, for it exists intermixed with nearly every other hepatic.

Of *Jungermania* there is only a single species, but it is new and very interesting. In the long sub-simple stems and the laterally accumbent roseate foliage, it might seem a slender form of *J. colorata*, from which it differs essentially in the *opposite* (not alternate) leaves, scarcely at all decurrent at the base. Unfortunately I found no perianths, though I sought for them sedulously.

The remaining genera are for the most part sparingly represented. There is one example of the anomalous genus *Noteroclada* (*N. arhiza*, n. sp.)—anomalous also as a species, from being almost utterly rootless, whereas its congeners have of all leafy hepaticæ the longest and strongest radicles.

There are luxuriant specimens, both ♂ and ♀, of *Marchantia chenopoda*, L.; and *Dumortiera hirsuta*, N., vindicates its claim to be a cosmopolite by appearing in very nearly the same form as the Irish variety (*D. irrigua*, Tayl.).

## FRULLANIA, Raddi.

## FRULLANIA (CHONANTHELIA) BOLIVIANA, n. sp.

Dioica, atropurpurea, flaccida, caulibus bipollicaribus, dense depresso-stratificatis, laxepinnatis bipinnatisque. Folia dissita, ramorum interdum subimbricata, late patentia, sub-concava, cordato-rotunda, auriculis baseos majusculis rotundis conniventibus; lobulus vix triplo brevior, cauli contiguus, late cuculliformis, margine orificii truncati interno paulo magis producto, sæpe compresso-inflexus, nunquam evolutus; cellulæ parvulæ, subconformes, ad angulos incrassatæ. Foliola duplo breviora, dissita, subrotunda, ex alis basi præcipue recurvis ad speciem spathulata, undulata, interdum medio margine in angulum obtusum producta, apice ad vel ultra  $\frac{1}{3}$  acute obtuseve bifida, segmentis erectis acutis. Flores ♀ in ramis terminales. Bracteæ bijugæ, foliis subæquilongæ, profunde bifidæ, cum bracteola in cyathum alte connatæ; lobo antico ovato, rotundato; lobulo angustiore, acuminato, canaliculato, extus lacinula aucto; bracteola angusta, breviter bifida, segmentis subulatis, margine utrinque 1-dentata. Perianthia alte emersa, involucro duplo fere longiora, elongate ovato-oblonga, dimidio supero fere rectangulari-prismatica, altiuscule 4-carinata, ex apice rotundato longirostria. Andrœcia in planta propriâ tenuiore axillaria, globosa, folia æquantia; bracteis parvulis paucijugis.—Folia  $1.3 \times 1.05$ , lobulus .5, cellulæ  $\frac{1}{40}$ ; foliola  $.65 \times .55$ ; bracteæ  $1.2 \times 0.9$ ; perianthia  $2.2 \times .95^{\text{mm}}$ .

*Hab.* Mapiri Boliviae, alt. 5,000 ped; Unduavi, alt. 8,000 ped; Ingenio del Oro, alt. 10,000 ped. (Nos. 3,039, 3,040, 3,042). Ab hac distat *F. tetraptera*, Mont. (in Chili a d'Orbigny, in monte Sorata Boliviae, alt. 10,000 ped. a Rusby lecta) florescentia monoica, statura minore, colore pallido viridive, foliis valde oblique cordatis, auricula antica magna truncata, postica vix ulla, apice cucullato-incurvis, lobulo interdum ex parte evolutu apiceque solum cucullato; foliolis brevissime (vix ad  $\frac{1}{2}$ ) fissis; bracteis acutis vel acuminulatis, lobulo acuminato subserrato; perianthiis ubique æquilatis, præalte carinatis.

*F. (CHONANTHELIA) TETRAPTERA*, Mont. Ann. des Sc. Nat. 1838. In monte Sorata, alt. 10,000 ped. (3,087 p. p.)

*F. (METEORIOPSIS) ATRATA* (Sw.). Frustula pauca inter alias hepaticas.

*F. (THYOPSIELLA) BRASILIENSIS*, Raddi. Inter *Plagiochilas* cæspitans.



## FRULLANIA (THYOPSIELLA) HUMILIS, n. sp.

Dioica, pusilla, rufo-badia, caule vix semipollicari laxè pinatim ramoso. Folia imbricata, patentia, subplana, oblique ovalia obtusa vel rotundata, basi antica semi-cordata (auricula oblonga subtruncata); lobulus triplo brevior, a caule parum distans et divergens, vel eidem fere parallelus, obconico-campanulatus, lævis, interlobulo tenui, subulato; cellulæ parvæ, pachydermes, subpellucidæ, subrhombæo-4—6-gonæ, inferiores sensim submajores. Foliola foliis haud duplo breviora, subcontigua, oblonga, breviter (ad  $\frac{1}{3}$ ) bifida, segmentis subacutis, margine laterali recurvo, basi breviter auriculata. Flores ♀ in ramo terminales. Bracteæ intimæ foliis duplo longiores, lobo ovato apiculato integerrimo subplano, lobulo aquilongo angustiore deltoideo-lanceolato subacuto, infra medium utrinque rude unidentato; bracteola paulo brevior, libera, oblonga ad  $\frac{1}{2}$  fere bifida, segmentis late subulatis acutis recurvo-canaliculatis, basi processulo tenui aucta. Perianthium (valde juvenile) lageniforme, apice in tubum sat longum et latum abiens, omnino ecarinatum. Pistillidia quatuor, prælonga. Folia .55 × .35, lobulus .18, cellulæ  $\frac{1}{10}$ ; foliola .32 × .20; bracteæ 1.0 × .65, bracteola .85 × .5<sup>mm</sup>.

Hab. Prope Yungas, Boliviae, in Orchidearum radicibus (No. 3,061). A *F. Brasiliana* certe diversa, statura humiliore, foliis obtusissimis, etc.

FRULLANIA (THYOPSIELLA) MOLLICULA, Spruce. (*F. rigescens* var. *mollicula*, Hep. Am. et And.)

Dioica, rufescens, dense stratificata; caules bipollicares symmetricè sed laxiuscule bipinnati, frondem anguste oblongam sistentes, ramis sæpe arcuantibus. Folia concinne non autem arcte imbricata, late patentia, concava, oblique semicordato-ovata, ex rotundato apice præminute apiculata, rarius mutica, toto margine incurvulo, auricula antica oblongo-rotunda; lobulus 6-plo fere brevior, erectus, anguste conicus, obtusus; cellulæ parvæ, opacæ, omnes fere—ad mediam basin præcipue—oblongatæ, trigonis magnis pellucidis. Foliola imbricata, foliis æquilata, dimidio breviora, orbiculata, ad  $\frac{1}{3}$  bifida, segmentis sub-acutis, margine anguste recurva, basi utrinque auricula magna rotunda aucta. Flores ♀ in ramis terminales. Bracteæ foliis sat majores, cochleato-concavæ, appressæ, ovato-orbiculatæ, ad  $\frac{1}{2}$  bifidæ, lobis sub æqualibus breviter tenui-acuminatis, postico autem inæqualiter bilobo et paucilaciniato; bracteola late ovalis, segmentis longius acuminatis sublaciniatis. Perianthia subsemiemersa, subcylindrica, alia superne paulo latiora, valde obtusetrigona—in ætate fere teretia—ex apice corrugato-inflexo, demum lacero, tenuirostel-

lata.—Folia  $1.4 \times .9$ , lobulus .25, cellulæ  $\frac{1}{8}$ ; foliola  $1.0 \times .9$ ; bracteæ 2.0; perianthia  $3.0 \times 1.0^{\text{mm}}$ .

Hab. Ad Yungas, Boliviae, alt. 6,000 ped. (no. 3,062 p.p.)—A *F. rigescens* et *F. laticauli* recedit habitu graciliore, ramificatione concinna; foliis subovatis; foliolis grandiauriculatis, paulo longioribus quam latis; bracteis latioribus, longius acuminatis, lobis pauciliniatis vel fere integerrimis; perianthiis apice pro m. inflexis. (Stirps Peruviana parum differt bracteis semper subintegerrimis et perianthiis apice conicis raro inflexis.)

FRULLANIA (THYOPSIELLA) LATICAULIS, n. sp.

Dioica, rufo-badia, caule 2-pollicari inæqualiter pinnato et subbipinnato, ramisque late foliatis. Folia arcte imbricata, patenti-divergentia, semicordato-oblonga abrupte subacuta, raro subapiculata, toto margine incurvulo, auricula antica subtruncato-rotundata; lobulus parvus (folio 5-plo brevior) tectus, breviclavatus vel obovato cylindricus, cauli approximatus et subparallelus, lævis, interlobulo minuto triangulari; cellulæ parvæ pachydermes subæquilateræ. Foliola imbricata, late orbiculata, foliis æquilata sed breviora, basi breviter biauriculata, apice ad  $\frac{1}{3}$  acute bifida, segmentis ovatis minute apiculatis, apiculo (e margine toto anguste recurvo) abscondito. Flores ♀ terminales. Bracteæ intimæ foliis majores ultra  $\frac{1}{2}$  bilobæ, lobis oblique ovato-oblongis cuspidatis, postice pauci-rude-dentatis, lobulis subæquilongis inæqualiter bifidis et segmentis bracteolæ oblongæ ad  $\frac{1}{2}$  fissæ lanceolatis acuminatis breviuscule laciniatis.—Folia  $1.4 \times 1.0$ , lobulus .3, cellula  $\frac{1}{8}$ ; foliola  $.9 \times 1.0$ ; bracteæ (lobus)  $1.8 \times 1.0$ , bracteola  $1.6 \times .9^{\text{mm}}$ .

Hab. Ad Yungas Boliviae, alt. 6,000 ped. no. 3,062 p.p.—Ab hac differt *F. rigescens* Hep. Amaz., foliis brevioribus et rotundioribus, auriculâ anticâ majore crispatâ, margine postico toto fere latius incurvo (ad *Lej. xanthocarpæ* instar), lobulo præminuto; foliolis basi angustatis; bractearum lobulis bracteolisque longissime laciniatis; perianthiis apice subulatis.

OBS.—*F. laticaulis*, although included in the same packet as *F. mollicula*, had evidently grown apart from it, and, when moistened, the much broader stem (with the leaves), the irregular branching, and the other characters, seemed sufficient to separate it specifically.

FRULLANIA (DIASTALOBA) ODONTOSTIPA, n. sp.

Dioica, pusilla, rufo-badia, laxè reptans, caule sesquipollicari, pinnato, ramis breviusculis sæpe parvifoliis. Folia dissita vel

contigua—ramea subimbricata—subdivergentia, late oblique ovata, subplana, apice decurvulo abrupte acuta vel brevissime apiculata, basi antica subsemicordata caulem velantia; lobulus 4-plo brevior, obovatus clavatusve, celluloso-papulosus, a caule distans, parum divergens, interlobulo magno subrhombico; cellulæ parvulæ rhomboideo-hexagonæ, trigonis magnis, paucæ basales submajores. Foliola foliis vix duplo breviora, subquadrata, ad  $\frac{1}{3}$  bifida, segmentis subacuminatis, utrinque rude 1-3 dentatis lacinulatisve.—Folia .65 × .55, lobulus .15, cellulæ  $\frac{1}{4}$ ; foliola .35 × .30 mm.

Hab. Supra *Lejeuneam filiformem*, Sw. reptans, pauca exemplaria sterilia carpsi. (No. 3,069, etc.)—A *Frullania Magellanica* ceterisque *Diastalobis* certe distincta.

### LEJEUNEA, Lib.

L. (OMPHALANTHUS) FILIFORMIS (Sw.) Ubique Andium sylvestrium, in ditione Yungas præcipue, frequens, nunc cespites latos homogeneos sistens, nunc *Plagiochilis* ceterisque hepaticis immixta (Nos. 3,069, 3,043, 3,017, 3,083 p.p.)

L. (BRYOPTERIS) TENUICAULIS, Tayl. Ingenio del Oro, 10,000 ped., pl. ♂ sola. (No. 3,030).

L. (BRACHIOLEJEUNEA) LAXIFOLIA, Tayl. Sorata, 10,000 ped. No. 3,087; Unduavi, 12,000 ped. (No. 3,089 p.p.).

L. (BRACHIOLEJEUNEA) BICOLOR, Mont. Frustula sola, cum *Plagiochilis* mixta.—First described by Montagne from Bolivian specimens, gathered by d'Orbigny.

### LEJEUNEA (BRACHIOLEJEUNEA) CLAVULATA, n. sp.

Dioica, pallide rufo-viridis, caule e caudice repente libero subarhizo, pollicari, vage ramoso. Folia dense imbricata, superiora sensim majora, decurva, in sicco devoluta (unde rami clavato-julacei videntur), oblique semicordato-ovata, rotundata vel abrupte obtusa, recte vel subsinuato-complicata; lobulus triplo fere brevior, ad carinam convexam inflatus, margine appresso transverso tridenticulato; cellulæ mediocres, subpellucidæ, pariete ad angulos, interdum etiam ad latera incrassato. Foliola perpaulo minora imbricata, late orbiculata, longissime decurrentia, toto ambitu, (apice excepto) recurva, cochleata. Flores ♂ in rami apice mediove spicati; bracteæ plurijugæ, foliis minores, inflatæ, lobo ovato, lobulo brevior apice libero plerumque triangulari; antheridia bina, magna, stipitata.—Folia 1.3 × 0.9, lobulus alt. .5, cellulæ  $\frac{1}{8}$ ; foliola .65 longa (ad axin) 1.0 (ab ipsa basi decurrente), 1.0<sup>mm</sup> lata.

Hab. Mapiri, Bolivia, (No. 3,072). *L. corticali*, L., et *L. subaffinis*, differt, ramis clavatis, foliis multo majoribus, foliolis pro ratione maximis, apice rotundatis (nec cuneatis ac retuso-truncatis).

L. (HOMALOLEJEUNEA) GUILLEMINIANA, Nees. Exemplaria perpauca (fertilia) inter *Plagiochilas* vigentia.

L. (DICRANOLEJEUNEA) AXILLARIS, Mont. Inter cæspites *Taxilej. isocalycinæ*, e. a. serpens.

LEJEUNEA (LOPHOLEJEUNEA) RUSBYI, n. sp.

Monoica et dioica, olivaceo-viridis, elatiuscula, caule repente, 1—1½ poll. longo, vage ramoso, ramis inæquilongis. Folia subdivergentia, subimbricata, oblique semicordato-ovata, breviuscule acuminata, acuta, apice decurvo serrulata, raro integerrima, subsinuato-complicata, lobulo plus duplo brevior, inflato, ovoideo-conico, apice truncato, apiculo incurvo aucto; cellulæ mediocres, conformes ambitu opacæ, trigonis parvis ad angulos et media latera incrassatæ. Foliola lobulis sub-breviora, distantia, orbiculata, apice leviter recurva. Flores ♀ in caule ramove terminales, absque innovatione. Bracteæ foliis longiores, falcato-dimidiatæ, acuminatæ, toto fere margine distanter serrulatæ, lobulo duplo brevior lineari subcomplicato auctæ; bracteola (= bracteæ  $\frac{2}{3}$ ) oblongo-rotunda, integerrima. Perianthia alte emersa, obovata, brevirostria, inferne sensim angustata, compressula, alte 4-carinata (facie antica subecarinata), carinis ab ipsa ferebasi alâ crebre laciniatâ armatis, laciniis subulatis curvulis. Andrœcia ramo inferiore constantia; bracteæ plurijugæ, lobis parum inflatis, subæqualibus, obtusatis.—Folia .85×.65, lobulus .38, cellulæ  $\frac{1}{2}$ ; foliola .35×.4; bractea 1.05×.65, bracteola .65×.6; perianthia 1.3×.9<sup>mm</sup>.

Hab. Inter *Plagiochilas* ad Mapiri Boliviae orientalis; alt. 5,000 ped. (No. 3,081). A *L. Muelleriana*, G. proxima, differt foliis acuminatis subserratis, foliolis longe minoribus, etc.

L. (ANOPLOLEJEUNEA) HERPESTICA, Hep. Am. et And.—In *L. filiformi* aliisque hepaticis sparsim hospitans.

This very curious hepatic was found only once by myself, in very small quantity, but fertile, on the upper Rio Negro. In Bolivia, however, it was gathered by Dr. Rusby at all his stations, growing sparingly, intermixed with other hepatics, and always sterile.

L. (ODONTOLEJEUNEA) PERUVIANA, L. et L. In *Acrostichi* frondibus ad Yungas (No. 3,025 p.p.)



L. (PRIONOLEJEUNEA) LEPTOCARDIA, Spruce, Hep. A. et A. In *Acrosticho*, cum priore, pulchre fructifera.

L. (PRIONOLEJEUNEA) DENTICULATA, Web. In *Plagiochilis* frequenter reptans. Sterile plants of one or two apparently distinct species also occur, but very sparingly.

L. (PRIONOLEJEUNEA) MICRODONTA, G. In *Plagiochila*, parcissime.

LEJEUNEA (CERATOLEJEUNEA) MALLEIGERA, n. sp.

Monoica, pusilla, rufo-badia, subbipinnata, caule semipollicari prostrato. Folia sat magna, subimbricata, late patentia, vix decurvula, late dimidiato-ovata, subfalcata, integerrima, abrupte acuta, rarius subobtusa, recte vel subsinuato-complicata, lobulo 5-plo brevior, ovato-rhomboides, subinflato, truncato; cellulæ parvulæ, leptodermes, subconformes, basin et marginem posticum versus sensim submajores. Foliola triplo breviora, distantia, ovalia, ad  $\frac{1}{2}$  bifida, segmentis acutis vel subobtusis. Flores ♀ in ramo pro m. brevi, innovatione suffulti. Bracteæ appressæ, foliis breviores, complicato-bilobæ, lobis semiobovato-lanceolatis obtusatis; bracteola cuneato-lanceolata, ad  $\frac{1}{2}$  bifida, segmentis acutis. Perianthia nisi pro cornibus immersa, obovato-obconica, sat compressa, tetragona, angulis duobus posticis in cornua clavata (formâ potius bicipitis mallei) erecta protracta, clavis apicalibus sat magnis subcylindricis, pallidis, reticulatis, ad speciem stipitatis. Andrœcia spicata; bracteæ subdissitæ, oblongo-cymbiformes, fere æquilobæ.—Folia .75×.5, lobulus .15, cellulæ  $\frac{1}{16}$ ; foliola .25×.15; bracteæ .5, bracteola .4; perianthia .4×.2 (sine malleis .3; capite .2, stipite .1<sup>mm</sup>.)

Hab. In fronde *Acrostichi*, in Andibus Bolivix orientibus (No. 3,025 p.p.).

LEJEUNEA (CERATOLEJEUNEA) FASTIGIATA, n. sp.

Dioica, elata, olivaceo-badia, caulibus 2-3 pollicaribus, arcte cæspitosis, fastigiatis, subsimplicibus, rarius ramulis parvifoliis pinnulatis. Folia magna, subimbricata, valde decurvo-concava, semicordato-oblonga vel ovato-oblonga, basi anticâ caulem late transeuntia, posticâ subrecte lobulata, lobulo minuto ovoideo apice inflexo, in ramis interdum majore et saccato, raro in utriculo magnum dilatato, apice plerumque subabrupte brevipiculata rarius 2-4 denticulata; cellulæ mediocres, subpellucidæ, conformes, basin versus paulo majores ocellum vix sistentes. Foliola foliis subæquimagna, late orbiculata, basi profundissime cordata, apice rima triangulari ad  $\frac{1}{4}$  fissa, segmentis subacumi-

natis acutis, margine utrinque late incurva. Flores nullos invenire potui.—Folia  $1.3 \times 1.0$ ,  $1.05 \times .75$ ; lobulus .15, cellulæ  $\frac{1}{8}$ ; foliola  $.95 \times 1.05$ ,  $.8 \times 1.05^{\text{mm}}$ .

Hab. In Andibus Boliviae orientalibus sylvaticis, ut videtur ad rupes humidas, sociis *L. filiformi*, *Leioscypho schizostomate*, *Fungermania oppositifolia* n. sp., late cæspitosa, vel in *Plagiophilis* repens, (No. 3,035A, &c). Ab affinibus distat foliis pro m. breviapiculatis; foliolis maximis, basi altissime emarginato-cordatis, segmentis apicis subacuminatis. Frequens videretur, semper autem sterilis et eflorifera.

L. (CERATOLEJEUNEA) ARHEXIA, Spruce Ms.—A single stem growing with *L. pallescens*. Among my Andine plants I have found fertile specimens of this new species, which is one of the very few Ceratolejeuneæ having underleaves entire at the apex.

LEJEUNEA (HARPALEJEUNEA) INCRESCENS, n. sp.

Monoica, minuta, caule  $3^{\text{mm}}$  longo, repente, parce et vage ramoso. Folia subcontigua, subplana, divergentia, oblique ovalia breviuscule acuminata, acuta, sinuato-complicata; lobulus triplo brevior, semiovoideus, turgidus, apice inflexo; cellulæ parvæ subæquilateræ, planæ, pellucidæ, ambitu anguste opacæ. Foliola minuta, lobulis subduplo breviora, squarrosa, obovata, ad  $\frac{1}{2}$  bifida, segmentis acutis. Flores ♀ in ramo brevi (innovato) terminales. Bracteæ foliis sublongiores, lanceolatae, parvi-lobulatae; bracteola angusta, ad  $\frac{1}{4}$  bifida. Perianthia parum emersa, late pyriformia, subturbinata, 5 carinata, carinis papillis articulatis armatis. Andrœcia rara, parva, bracteis 1-2 jugis.—Folia  $.3 \times .2$ ; perianthia  $.45 \times .35^{\text{mm}}$ .

Hab. In *Lej. (Bryopteride) tenuicauli*, T., parasitans, juxta Ingenio del Oro, Boliviae.—A nostra *L. trachygona*, Hep. A. A. diversa, cui adsunt caulis pinnatus, folia ovato-acuminata, fornicata, celluloso-crenulata, perianthia multo longiora, etc.

Flowerless stems of two other *Harpalejeuneæ* were picked off other hepaticæ, but too imperfect to be named with certainty.

L. (DREPANOLEJEUNEA) STENOPHYLLA, Ldng.?—Mapiri, 5,000 ped (No. 3,075 p. p.)—I have not seen original specimens of Lindenberg's plant, but fertile specimens picked out of Liebmann's hepatics agree with the description in "Hep. Mexicanæ," and they are quite the same as the Bolivian plant, which, however, is sterile.

L. (DREPANOLEJEUNEA) INCHOATA, Meissn. Frustula sola visa in *Plagiochila* parasitantia.

L. (TAXILEJEUNEA) ISOCALYCINA, G. Yungas, etc., ut videtur haud infrequens, colore albicante insignis, raro tamen fertilis. (Nos. 3,035, 3,028 p. p.).

LEJEUNEA (TAXILEJEUNEA) MARASMODES, n. sp.

Dioica (?) virens, flaccidissima, caule pollicari parum ramoso. Folia distantia, subplana, semiovato-triangularia, apiculata acuminulatave, elobulata, basi antica rotundata vix semicordata; cellulæ mediocres, subconformes, pellucidæ. Foliola plus duplo breviora, distantia, late subcordato-ovata, ad  $\frac{1}{3}$  obtuse fissa, segmentis acutis. Flores ♀ in ramo brevi seriati (manci solum visi). Folia  $1.0 \times 1.0$ , cellulæ  $\frac{1}{12}$ ; foliola  $.4 \times .4^{\text{mm}}$ .

Hab. Supra *Noterocladam arhizam* et *Marchantiam* sp. repens, ad Sorata, alt. 10,000 ped., in Andibus Bolivianis sub. No. 3,005 p.p.

L. (MACROLEJEUNEA) SUBSIMPLEX, Mont. Pauca exempl. in *Plagiochila* decerpta.

L. (MACROLEJEUNEA) PALLESCENS, Mitt. var. Yungas, 6,000 ped. (No. 3,050 p.p.). A typo æquatoriali differt foliis planioribus brevius acuminatis; foliolis basi vix cordatis, segmentis solum acutis. Perianthia autem eadem sunt: minuta, primum superne obtuse 5-gona, matura teretia, solum apice obscure 5-corrugato inflexo. Florescentia etiam monoica exacte conformis est.

L. (HYGROLEJEUNEA) CERINA. Yungas, 6,000 ped. (No. 3,028 p.p.)

L. (HYGROLEJEUNEA) REFLEXISTIPULA. Frustula supra *Plagiochilam* inventa.

LEJEUNEA (HYGROLEJEUNEA) PASTASENSIS, Spruce, in Hep. Am. et And. var. PUNCTULATA n. var.

Dioica, caule pollicari, repente, subpinnato. Folia magna flavescentia, subimbricata, late patentia, oblique semicordato-ovata, apice decurvo acuta, subsinuato-complicata, lobulo vix triplo brevior semiovato, solum ad plicaturam subrectam subinflato, margine rotundato appresso, in lobum sensim transeunte vel breviter truncato; cellulæ mediocres, leptodermes, pellucidæ, aliæ autem ubique in folio sparsæ, cæteris cellulis æquimagnæ vel minores, annulo opaco circumdatae, solum in centro pelli-

cidæ. Foliola paulo minora, subimbricata, cordato-reniformia, apice lato recurvulo brevissime bidentula, dentibus acutis, sinu obtuso.—Folia  $1.5 \times 1.25$ , lobulus  $.6 \times .4$ ; cellulæ  $\frac{1}{10}$ ; foliola  $.85 \times 1.1^{\text{mm}}$ .

Hab. Bolivia, juxta Mapirí, in arboris ramulo, (No. 3,075).—*L. devoluta*, Hep. Am. et And. folia foliolaque habet minora, crenulata, hæc magis transversa toto margine recurva, cellulas minores, omnes conformes; *L. Pastasensis* ejusd. op. tamen a stirpe Boliviana vix differt nisi foliis subapiculatis epunctatis.

LEJEUNEA (EULEJEUNEA) GRACILICAULIS, n. sp..

Dioica, pusilla, virescens, caule semipollicari, repente, tenui, flaccido, elongato, sæpe ramulis parvifoliis pinnulato. Folia subdissita vel parum imbricata, late patentia, plana, suboblique oblongo-orbiculata, subsinuato-complicata, lobulo 4-plo fere brevior, ovoideo, inflato, apice brevi inflexo; cellulæ parvulæ, pelucidæ, leptodermes. Foliola foliis triplo breviora, obovato-cuneata, ultra  $\frac{1}{2}$  bifida, segmentis lineari lanceolatis, 4 cellulas latis, obtusis vel subacutis.—Folia  $.45 \times .35$ , lobulus  $.125$ , cellulæ  $\frac{1}{10}$ ; foliola  $.15^{\text{mm}}$ .

Hab. Bolivia, loco Mapirí, *Plagiochilæ* sp. irrepens (No. 3,078 p.p.).—Ab omnibus Eulejeuneis parvistipulis diversa.

L. (EULEJEUNEA) GAUDICHAUDII Ldng. var. In *Plagiochilis* parasitans (No. 3,049, 3,075, &c., p.p.). Cum exempl. cl. Gaudichaudi archetypis comparata foliis laxioribus planioribusque et vix aliter differt.

L. (EUOSMOLEJEUNEA) CONDENSATA Spruce, Hep. Am. et And. Yungas, &c., cum *Lepidoziis* præcipue consociata (No. 3,070, 3,071, 3,075, p.p.).

RADULA, Dumort.

R. RAMULINA, Tayl. (*R. Xalapensis* G. Mex. Leverm. nec Montagnei).—Yungas, cum *Plagiochila frausa* (No. 3085 p. p.); etiam *Plagiochilas* varias varo infestans.

R. XALAPENSIS Mont. ! Ann. des Sc. Nat. (1836); ejusdem in d'Orbigny Voy. dans l'Amérique, 62, t. 2, fig. 4.

Through the favor of M. Bescherelle I have been able to examine Montagne's original specimens of this species, and can testify to the accuracy of his description and figure above cited. The "*R. Xalapensis*" described by Gottsche in 'Mex. Levêrm.'



is an entirely different plant, viz. the *R. ramulina*, Tayl., which stands next to the Irish *R. voluta*, Tayl. Dr. Rusby gathered the true *R. Xalapensis* at Yungas (alt. 6,000 ft.), No. 3,034, and *R. ramulina* occurs sparingly in several packets of his collection, mixed mainly with *Plagiochilæ*; but his *R. Xalapensis* is accompanied by a new and very distinct species of the same genus (*R. clavulata*, Ms.) which has the rare peculiarity of a monoicous (autoicous) inflorescence, the great mass of the genus consisting of purely dioicous species.

R. PALLENS, Sw. *var.* Yungas, etc., (cum Nos. 3,063, 3,009, 3086, mixta).

R. AMAZONICA, Spruce Hep. A. et A. Inter *Plagiochilas* rarius reptans. (No. 3,055, etc.)—Specimina speciei affinis, nimis juvenilia et incompleta, adsunt sub No. 3,052.

#### RADULA MAMMOSA, n. sp.

Dioica, pusilla, flavens, arcte repens, caule 1-1½-pollicari, laxe bipinnato, ramis subinde dichotomis. Folia subimbricata, supra lobulum divergentia, falcato-oblonga, rotundata, valide sinuato-complicata; lobulus plus duplo brevior, subrhombeus, valde saccatus et ex eo deorsum arcuatus vel fere in angulum abiens, mammillam præaltam obtuse conicam proferens, ad originem superiorem haud auriculatus; cellulæ parvulæ, opacæ, trigonis nullis. (Folia caulina inferiora interdum vix mammillifera). Flores ♀ terminales cum innovatione, sæpe dichotomiales. Bracteæ foliis minores, magis falcatae, lobulo angusto plano. Perianthia alte exserta, foliis 4-5 plo longiora, stricta vel arcuantia, clavato-tubæformia, inferne teretia, ore compresso, truncato, obscure laticrenato.—Folia .8×.55 (ad lobuli apicem)×.8 (ad basin ipsum) lobulus .3 (ad insertionem mensus), cellulæ ¼; perianthia 3.0-4.0×.55mm.

Hab. Bolivia orientali in *Acrostichi* frondibus cum *Lejeuneis* repens. (No. 3,025 p.p).

#### RADULA CLAVIFLORA, n. sp.

Autoica, flavicans, 1-1½ pollices longa, caule nisi in ipsa basi a matrice libero subpinnatim ramosa. Folia subplana, subimbricata, late patentia, basi in caule utrinque alte incurrentia, semicordato-oblonga, rotundata auricula basali caulem transeunte, subrecte complicata; lobulus triplo fere brevior, subquadratus, ad carinam vix inflatam recte vel arcuatim decurrens, obtusus, margine supero carinæ subparallelo medio sinuato-inflexo, angulo

basali libero parvo caulem vix velante, mammilla vix ulla, raro radicellifera; cellulæ parvæ, subæquales, ambitu late opacæ, pariete pellucido ad angulos perpaulo incrassato. Flores ♀ terminales, innovati, sæpe dichotomiales. Bracteæ foliis subbreviores erectæ, complicatæ, lobo subfalcato-oblongo, lobulo fere æquilato duplo (vel solum dimidio) brevior. Perianthia foliis plus duplo longiora, clavata, inferne teretia, ore compresso truncato subcrenulata. Andrœcia in caule ramisque media, rarius terminalia; bracteæ paucijugæ, foliis breviores, turgidæ, lobulo lobi  $\frac{2}{3}$  æquante.—Folia  $1.3 \times 0.9$ , lobulus (ad carinam) .5, cellulæ  $\frac{1}{18}$ ; bracteæ lobus  $1.1 \times .55$ ; perianthium  $3.0 \times .3$  (basi)  $\times .7$  (apice) mm.

Hab. Ad arborum ramos in prov. Yungas, Bolivæ, alt. 6,000 ped., socia *R. Xalapensi* Mont.—*R. Cordovana* Steph. in 'Hedwigia' (1884), huic quoad florescentiam proxima, differt foliis ovatis, haud decurrentibus, et perianthio a basi obconica oblongo.

### SCAPANIA, Dumort.

*S. PORTORICENSIS*, Hampe et G., Hep. Portoricenses (1853); *S. splendida*, Spruce, Hep. A. et A. (1885). Yungas, alt. 6,000 ped. (No. 3,068 p.p.)

### ISOTACHIS, Mitt.

*I. SERRULATA* (Sw). Yungas, alt. 6,000 ped. (No. 3,037). Unduavi, alt. 10,000 ped. (No. 3,038.) Specimina pulcherrima!

### HERBERTA, Gray.

#### HERBERTA SERRATA, n. sp.

Dioica, rufo-fusca, caule bipollicari, a basi tenui subrhizomatosa parce flagelliferâ assurgens, simplex vel subramosa. Folia magna, densa, inferne breviter erecta dein subsquarroso-secunda, foliolaque (vix minora, magis exacte transversa) dimidio inferiore ovalia concava, margine runcinato-dentata, basi subsagittatim producta, ad medium bifida; laciniis lineari-subulatis, acutis, canaliculatis, inæqualiter serratis; cellulæ subconcolores, axiales (pluriseriatæ) majusculæ, lineares, plerumque medium versus utrinque isthmo tenui cum collateralibus anastomosantes, marginales breviores subrhomboideæ, omnes valde pachydermes, pariete latissimo. Flores ♀ in caule terminales, innovati. Bracteæ plurijugæ foliis submajores, dense imbricatæ, profunde bisulcæ, infra medium arcte runcinato-dentatæ; laciniæ laciniato-serratæ.—Foliorum pars integra  $2.0 \times 1.35$ , laciniæ  $2.0 \times 0.5$ , cellulæ mediæ  $\frac{1}{10}$ , submarginales  $\frac{1}{32}$  mm.

Hab. In Boliviae Andibus, loco Unduavi, alt. 10,000 ped., muscis immixta, (No. 3,084).—Differt *H. runcinata*, Tayl. foliis basi cordatis, laciniis integerrimis, etc.

### LEPICOLEA, Dumort.

L. CCHROLEUCA, Nees. Yungas, alt. 6,000 ped. (No. 3,068 p. p.)

### BAZZANIA, Gray.

B. ARCUATA, L. et G. Mapiri, alt. 5,000 ped. (No. 3,027).

B. CHILENSIS, Steph. Yungas, alt. 6,000 ped. (No. 3,029 p. p.).

B. LINDIGII, Gottsch. Yungas, alt. 6,000 ped. (No. 3,023).

### BAZZANIA RUSBYI, n. sp.

Dioica, depresso-cæspitosa, 5<sup>cm</sup> longa, pallide viridis, pellucida, iteratim dichotoma, angulo furcavum recto, flagellifera. Folia majuscula, alterna, subimbricata, patenti-decurvula, oblique semicordato-ovato-ligulata, oblique truncato-tridentata, dentibus subacuminatis acutis, medio plerumque submajore, sinubus acutis rarius obtusis, basi anticâ caulem transeuntia, posticâ inflexa; cellulæ pellucidæ, subconformes, axiales et subbasales submajores et oblongatæ, ad auriculam multo minores, omnes pachydermes trigonis (haud magnis) solum ad angulos, mediis nullis. Foliola triplo fere breviora, contigua vel subdissita, rotundo-quadrata, toto margine argute spinuloso-dentata, spinulis ad apicem latum truncatum 5-8, ad marginem utrinque sub 4, basi hinc minute auriculata, illinc cum folio collateralis subconnata; cellulæ omnes conformes, basin versus sensim paulo minores.—Folia  $2.35 \times 1.35$ , cellulæ mediæ  $\frac{1}{8}$ ; foliola  $.85 \times .85$  mm.

Hab. In Bolivia orientali, alt. 6,000 ped., loco Yungas, ad truncos velustos. (No. 3,029).—Species insignis, quoad foliola ubique argute dentata, solum cum *B. Peruviana* et *B. Novæ-Hollandiæ* comparanda, quibus autem adsunt folia semper opposita. *B. Lechleri*, Steph. subsimilis, minor est, fuscescens, sinubus foliorum apicalibus lunatis; foliolis margine solum angulatis, cellulis apicalibus elongatis. *B. denticulata*, L. et G., forsan magis affinis, distat statura humiliore, opacitate (quando *B. Rusbyi* insigniter pellucida est), foliolis multo minus argute dentatis, margine præcipue, etc.

## LEPIDOZIA, Dumort.

*L. CUPRESSINA* (Sw). Yungas ; Mapiri, cum Orchideis, etc. (Nos. 3,026, 3,064, 3,070, 3,071). Agrees well with an original Jamaican specimen from Swartz. Grows in wide depressed tufts, very much as *L. reptans* does with us. Leaves have sometimes, but very rarely, 1-3 rudimentary teeth at antical base. Near insertion of a branch a six-cleft underleaf is occasionally seen. Laciniaë of both side leaves and under leaves are simply subulate, rarely with the slightest acumination. But in the Peruvian *L. tenuiscuspis* (= *L. cupressina* var. *tenuiscuspis*, Hep. A. et A.) all the leaf segments end in a slender cusp of a single row of cells—in the underleaves as much as 6-9 cells long. From this and some other differences I prefer to regard it as a distinct species, under the MS. name (*L. tenuiscuspis*) proposed in 'Hep. Am. et And.'; especially as I have seen no intermediate form from any country.

*LEPIDOZIA TRUNCATELLA*, N. VAR. *ALTIRIMATA*, S.

Dioica, griseo-viridis, laxe depresso-cæspitosa ; caules sesquipollicares laxè pinnati, pinnis longitudine variis, aliis prelongis, persæpe apice flagellari-attenuatis, rarius pinnulatis. Folia imbricata, subtransversa, concava, suboblique ovato-quadrata, profunde 4-fida (antice paulo ultra medium, postice ad  $\frac{3}{4}$  usque), basi utrinque subampliata, antice rude 2-3-dentata, postice hastatim 1-dentata ; laciniaë subulatæ repandæ, postica paulo minore, sinubus acutis, cellulæ parvæ, subquadratæ, pachydermes, trigonis vix ullis. Foliola perpaulo breviora, quadrata, basi utrinque 1-3 dentata, ab apice ultra  $\frac{3}{4}$  quadrifida, laciniis lineari-subulatis, obtusis vel subacutis, repandis, quinta minore interdum adjecta.—Folia .5 × .5 ; foliola .4 × .35 ; cellulæ  $\frac{1}{5}$  mm.

Hab. ad viam quæ ducit à Sorata ad Mapirí, in arboribus vetustis saxisque (No. 3,082)—A. *L. truncatella*, L. et G., Capensi, distat foliis, foliolisque magis profunde fissis vix autem specifice separanda.

*L. PLUMÆFORMIS*, Spruce, n. sp. in Hep. Glaziovianis No. 7,135 Rév. Bryol. 1887.—Yungas, alt. 4,000 ped. (No. 3,046).

*L. CAPILLARIS*, Sw.—Cum *Plagiochilis* et *Bazzaniis* rarius immixta, semper sterilis.

*L. (TELARANEA)* sp.—Cum priore aliisque, rarissime. For-  
san pro *L. chatophyllæ*, Hep A. et A. var. habenda.



## CEPHALOZIA, Dumort.

## I. CEPHALOZIA FRAGILLIMA, n. sp.

Dioica, pusilla, albicans, caule semipollicari, tenui, fragillimo, paucirameo, æquifoliato. Folia dissita, subdivergentia, cuneata, ultra  $\frac{1}{2}$  bifida, segmentis late subulatis, acuminatis; cellulæ minutulæ, pellucidæ, oblongo-quadratae. Foliola nulla. Flores ♀ rari, in ramo pro m. brevi postico terminales; imperfecti solum visi, muco obtecti. Bracteæ serratae. Perianthia trigona (imperfecta muco obruta).

Hab. Bolivia, loco Mapiri (No. 3,076)—Incomplete descripta attamen a *C. divaricata* certe distincta.—In eodem cespite, arcte intricata crescit *Marsupellæ* species, sterilis, olivacea, foliis duplo majoribus, subcomplicatis, ad medium solum bifidis, segmentis semi-lanceolatis, acutis vel subobtusis. Indescripta videtur.

## PLAGIOCHILA, Dumort.

## PLAGIOCHILA (§ SPINULOSÆ) MAPIRIENSIS, n. sp.

Dioica, rufescens; caules sesquipollicares, e caudice breviter repente suberecti flexuosi, parum ramosi. Folia approximata, opposita, decurvo-secunda, dimidiato-oblonga vel subovato-oblonga, obtusa vel truncata, utrinque decurrentia, margine antico recurvo integerrima vel sub apice 1–2-dentata, postico supra basin cuneatam integram apiceque paucispinoso-dentata, dentibus omnibus 8–15, inæqualibus, duobus apicalibus sæpe magnis; cellulæ mediocres subpellucidæ. Flores ♀ terminales, innovati. Bracteæ unijugæ, laxe involucrantes, foliis sat longiores, margine postico crebrius longiusque spinosæ, antico revoluta dentibus 1–3 armato. Perianthia (immatura) immersa cupulata, exalata, ore subbilabiato spinoso-ciliata, aliis ciliis longissimis.—Folia  $2.5 \times 1.4$ ,  $2.5 \times 1.1$ , cellulæ  $\frac{1}{4}$ ; perianthia  $2.5 \times 1.35^{\text{mm}}$ .

Hab. In Andibus Bolivianis, loco Mapiri alt. 5,000 ped. (sub No. 3,078.)—*P. oresitrophæ*, Spruce, e foliis oppositis affinis, ab illa certe distat foliis angustis paucidentatis, duplo longioribus quam latis.

P. ORESITROPHA, S. Hep. Am. et And. var. Yungas, alt. 4,000 ped. (No. 3,024). A typo Peruviano paulo differt foliis minus crebre ciliatis.

P. GYMNOCALYCINA, M. et N. var. SUBSIMPLEX, Syn. Hep. 32. Yungas, alt. 6,000 ped. (No. 3,048). "In Peruvia locis saxosis humidis sylvarum circa Moletto, et in sylvis excelsis

secus vias prope Chupe prov. Yungas" (Orbigny in herb. Montagne). The much narrower leaves, toothed only toward the apex, seem to mark this for a distinct species; but I have seen no perianths, and dare not separate it. From *P. Mapiriensis* it differs essentially in the alternate (not opposite) leaves.

*P. MACRIFOLIA*, Tayl. var. Yungas, alt 4,000 ped. (No. 3,051.)

*P. RUTILANS*, Lindenb. Yungas, alt. 6,000 ped (No. 3,047 p.p.).

*P. RUBESCENS*, Lindenb. Yungas, alt. 4,000 ped (No. 3,018). A few stems mixed with *P. viminea*, n. sp.

*P. TENUIS*, Lindenb. Yungas, 6,000 ped. (No. 3,060.)

*P. BIDENS*, Gottsch. Ann. Sc. Nat. (1857). Caules perpauci sterilesque inter alias *Plagiochilas* visi.

*PLAGIOCHILA* (§*SPINULOSÆ*) *GRACILICAULIS*, n. sp.

Dioica, tenuis, flaccida, virescens, caule bipollicari vage paucirameo. Folia distantia, decurvo-subsecunda, basi utrinque (antice præcipue) longe decurrentia, dimidiato-ovato-lanceolata, apice truncato bidentata, dentibus triangularibus, dentulo uno alterove interdum sinu interposito, margine antico recurvo integerrimo vel sub apice 1-2-denticulato, postico prælate sed laxe recurvo (basi integerrima excepta) distanter et breviter spinoso-dentato dentibus omnibus 10-11, cellulæ parvulæ, pellucidæ, inferiores subelongatæ, trigonis vix ullis. Flores ♀ terminales. Bracteæ 2, foliis majores, magis spinoso-dentatæ, antice dentes paucos monstrantes, altera (interior) perianthio subcontigua, altera dissita. Perianthia subemersa cupulato-campanulata, exalata, ore compresso rotundato spinoso-ciliata.—Folia,  $2.0 \times 1.0$ , cellulæ  $\frac{1}{10}$ ; perianthia  $2.8 \times 1.8^{\text{mm}}$ .

Hab. Yungas Boliviae; inter *Plagiochilam Bolivianam* (No. 3,020) exemplaria pauca carpsi.

*PLAGIOCHILA* (§*ASPLENIOIDEÆ*) *ALTERNANS*, Gottsche, Mex.

Leverm. 63, t. 7. var. *ANGUSTIFOLIA*, Spruce.

Dioica, flavo-viridis, caulibus tripollicaribus, assurgentibus, simplicibus vel ramum unum alterumve proferentibus. Folia magna, distiche explanata vel subconvexa, patentissima, late semiovato-oblonga, rotundata, basi breviter late cuneata, margine antico supra medium, postico toto (basi excepta) crebre minute spinuloso-denticulata, dentibus omnibus 25-30; cellulæ

mediocres, subæquilateræ, ad angulos vix subincrassatæ.—Folia  $4.3 \times 3.4^{\text{mm}}$ ; cellulæ  $\frac{1}{28} - \frac{1}{20}^{\text{mm}}$ .

Hab. Prope Yungas Boliviae, in ligno putrido. (No. 3,010)—*P. aspleniodi* (L.) persimilis, distat foliis crebrius et minutius denticulatis. *P. ovata*, G. et *calomelanos*, Spruce, folia basi semicordata, toto margine minute denticulata habent.—Ad eandem speciem referenda erit plantula in Costa Rica a cl. E. S. Hyde lecta; parum divergit caule ramosiore, foliis angustioribus ( $4.5 \times 2.5^{\text{mm}}$ ) sæpe decurvo-convexis, cellulis paulo majoribus; margine autem eodem modo denticulatis ceterisque characteribus cum stirpe Boliviana congruit. Stirps originalis Mexicana folia habet rotundiora, numero dentium tamen, &c., &c., cum nostris bene convenit.

*P.* (GRANDIFOLIÆ) ADIANTOIDES, vars.—Yungas, alt 6,000 ped., Unduavi, alt. 8,000 ped. (Nos. 3,010, 3,012, 3,013, 3,015, 3,016, 3,021, 3,047 pro parte).—Some of these forms, notably Nos. 3,012, 3,013 and 3,021, approach the West Indian "*P. superba*," but are hardly separable from typical *P. adiantoides*; and the "*P. superba*" gathered by d'Orbigny "in Boliviae locis udis silvarum inter Chupe et Yanacache" doubtless belongs to the same category. The original *P. superba*, founded by Nees on a plant gathered in the Mauritius by Sieber, however, seems distinct.

*P.* NOTARISII, Mitt. Yungas, alt. 4,000 ped. (Nos. 3,009, 3,011, 3,014). Cum forma æquatoriali archetypa convenit foliis prælatis, semicordato-triangularibus, paucidentatis, necnon perianthiis immersis late alatis, &c.; solum differt foliis paulo longioribus obtusioribusque.

*P.* HETEROMALLA, Ldng. var. foliis latis circumcirca fere denticulatis, dentibus sub 70. Mapiri, 5,000 ped. No. 3,019. The three forms described in Hep. Am. et A., distinguished namely by differences in the breadth of the leaves and in the degree of marginal dentation, belong to but one species. The tooting of the anterior margin is variable but never entirely disappears (as asserted by Lindberg). The presence or absence of a wing to the perianth is inconstant in all the forms.

PLAGIOCHILA (§ HETEROMALLÆ) IMPLEXA, L. et G. Hep. Mex. 76, t. XIII. Dr. Rusby gathered this species, mixed with

*Herberta serrata*, n. sp. at Unduavi (alt. 10,000 ft.), but only the male plant. It belongs to the § *Heteromallæ*, and agrees well with the description and figure in Gottsche's work. The leaves are smaller than in most of its congeners ( $1.2 \times 1.0^{\text{mm}}$ ) strongly secund and accumbent, suborbicular, but with the whole antical margin so strongly revolute that they seem almost dimidiate. The rounded, plane, postical margin is closely spinuloso-dentate, teeth about 20. Cells minute and opaque, thick-walled and sub-equilateral, but near the axis in the lower half less minute and twice as long as broad. ♂ spikes medial and terminal, ovato-fusiform; bracts monandrous.

Liebmann discovered this species on the volcano Orizaba, at 8 to 12,000 feet, or at nearly the same height as Rusby found it in the Bolivian Andes.

PLAGIOCHILA (§ *HETEROMALLÆ*) FRAUSA, Gottsch. var.

BOLIVIANA, n. var.

Dioica, cæspitosa, rufo-flavens; caules 1-2-pollicares, stricti, ramos paucos alternos proferentes. Folia subimbricata, plus minus decurvo-secunda, subtransversa, basi utrinque (antice præcipue) decurrente amplexantia, prælate semiovato-triangularia (potius deltoidea) acuta, margine antico stricto, late (non autem valide) recurva, unde folia canaliculata ab infero visa, integerrima vel sub apice 1-2-dentata; postico (basi longa integra excepta) valde rotundato spinuloso-dentata, dentibus omnibus sub 12, brevibus peracutis; cellulæ parvæ, opacæ, trigonis auctæ.—Folia  $1.8 \times 1.5$ , cellulæ  $\frac{1}{8}$ .

Hab. Yungas Boliviae, alt. 6,000 ped. (No. 3,048 p.p.)—*P. deltoidea*, Lindng., e Nova Zelandia, huic persimilis, folia habet majora, magis dimidiata, margine postico ab ipsa fere basi validius dentata. *P. Bahiensis* Lindng. caule flagellifero, foliis utroque margine apiceque rotundatis distat. In nostra, alii rami interdum videntur ex parte exfoliati, pro flagellis autem vix habendi. *P. frausa* typica, Mexicana, folia habet paulo longiora, magis argute dentata, alioquin omnino conformis est.

PLAGIOCHILA (§ *HETEROMALLÆ*) VIMINEA, n. sp.

Dioica, elata, flavo-viridis, caulibus 2-3-pollicaribus, cæspitosis, e basi decumbente suberectis, strictis et quasi vimineis, subsimplicibus, raro fastigiato-ramosis, valde polyphyllis. Folia



parva, inbricatula vel solum contigua, plus minus decurvo-se-cunda, semicordato-rotunda, margine antico rectiusculo late recurvo longe decurrente integerrima, postico prælate rotundato recurvo-cristato apiceque rotundato distanter spinuloso-dentata, dentibus 6-10; cellulæ parvulæ, convexulæ, ambitu late opacæ, incrassatione angulari nulla.—Folia 1.9<sup>mm</sup> longa (ab ipsa basi antica), 1.3 (a basi postica), 1.6<sup>mm</sup> lata, cellulæ  $\frac{1}{40}$ <sup>mm</sup>.

Hab. Bolivia, in prov. Yungas (No. 3,018) *P. bifaria* (Sw.) differt foliis angustioribus, ovato-oblongis, apice sæpe bicuspidatis.

PLAGIOCHILA (§FRONDESCENTES) RUSBYI, n. sp.

Dioica, elata, rufo-brunnea; caules e caudice repente a matrice liberi (penduli?) tripollicares, ab ipsa basi eleganter pinnati, pinnis sub 12 cujusque lateris, brevibus (mediis  $\frac{1}{4}$  pollicis longis), frondem lineari-lanceolatam sistentes. Folia latiuscule imbricata, patentia (ramea ad angulum acutum), utrinque basi longe decurrentia, late semiovata, subtriangularia, apice obtusa truncatave, margine antico recurvo sub apice 2-3-dentata, cæterum integerrima, postico (basi excepta) apiceque spinoso-dentata, dentibus omnibus numero 10-15, breviusculis, late subulatis, inæqualibus; cellulæ parvulæ, opacæ, pachydermes, mediæ axialesque paulo longiores. Foliola nulla. Flores non aderant.—Folia 1.8×1.25, cellulæ  $\frac{1}{40}$ .

Hab. In Andibus Boliviae orientalibus, loco Mapirí (alt. 5,000 ped. m. Aprili, 1886 (No. 3,031).—*P. thyoides*, Hep. Am. And. huic subsimilis, elatior est; foliis magis confertis, longioribus, solum apicem versus spinuloso-denticulatis; foliolis posticis majusculis adjectis.—*P. abietina*, Nees, differt caule fibrilloso, foliis tota fere longitudine argute spinoso-dentatis.

PLAGIOCHILA (§FRONDESCENTES) LIGNICOLA, n. sp.

Dioica, virescens, elata, caule tripollicari et ultra, robusto, pinnato et subbipinnato. Folia flaccida tenuia imbricata, distiche patentia, semiovato-triangularia, obtusata vel truncata, utrinque leniter recurva, basi haud longe decurrentia, dein postice sub abrupte dilatata et rotundata caulem transeuntia et vel appressa vel cristatim recurva, margine supra medium—antico sæpe solum versus apicem—denticulata, dentibus pro more parvis inæqualibus (numero circiter 12); cellulæ parvulæ pellucidæ, trigonis subnullis. Foliola nulla.—Folia 2.3×1.5, 2.0×1.2, cellulæ  $\frac{1}{40}$ <sup>mm</sup>.

Hab. In situ Yungas Boliviae, alt. 6,000 ped. ad ramos emortuos. (No. 3,022).—*P. deflexirama*, Tayl. distat caule duplo

longiore, ramis subsimplicibus, foliis semiovato-oblongis validius spinoso-dentatis.

PLAGIOCHILA (§ FRONDESCENTES) RUFOVIRIDIS, n. sp.

Dioica, e viridi rufescens, caule sesquipollicari pinnato, ramis rarius ramulum proferentibus. Folia imbricata, distiche patentia, semiovato-oblonga, basi subsemicordatâ caulem velantia vel recurvula, margine antico recurvo decurrente integerrimo vel denticulis 1-3 distantibus armata, postico distanter spinoso-dentata, apice subtruncato plerumque 4-dentata, dentibus omnibus 12-15 inæquilongis. Flores ♀ in ramis terminales. Bracteæ foliis subconformes, appressæ, antice serrulatæ, postice apiceque crebrius longiusque spinoso-dentatæ. Perianthia vix emersa, cuneata, compresso-obconica, oblique subtruncata, hinc ala perangusta integra percursa, ore dentibus parvis, crebris, brevibus subulatis armata.—Folia  $2.5 \times 1.35$  cellulæ  $\frac{1}{2}$ ; perianthia  $3.0 \times 1.8^{\text{mm}}$ .

Hab. Yungas Boliviae, aliis Plagiochilis et Lejeuneis immixta. (No. 3,050 p. p.) Stirps solitaria mihi adevat, ab affinibus omnibus sc. *P. distinctifolia*, cet., diversa videbatur.

*P. DIVERSIFOLIA*, L. et G.—Yungas, alt. 6,000 ped. (No. 3,063, 3,050 p. p.)

*P. LÆTEVIRENS*, Lindenb. var. ? Mapiri, alt. 5,000 ped. (No. 3,077).

*P. DISTINCTIFOLIA*, Lindenb. Yungas, alt. 4-6,000 ped. (No. 3,049, 3,050 p. p.)

*P. XANTHOCHROMA*, Spruce, Hep. Am. et And. Yungas, alt. 6,000 ped., fertilis. (No. 3,050 p. p.) As Dr. Rusby's specimens, although very few, possess good perianths, which were wanting in those I took as the type of the species, I add a brief description. As in the plant of Ecuador so in that of Bolivia, the leaves rapidly discharge their yellow coloring matter on being steeped in water, and remain quite bleached.

Folia utroque margine late recurva, in sicco tam revoluta ut distantia et pectinata videntur; alia apice bifidula, segmentis subspinuloso-denticulatis. Cellulæ materie colorante in aqua cito evacuatae scariosæ restant.

Flores ♀ in ramis terminales. Bracteæ subbijugæ, basi perianthium amplexantes, dein late patulæ, foliis paulo majores, margineque postico magis spinosæ. Perianthia emersa, cuneata, compressa, exalata, ore obliquo subrotundato-truncato crebre

longeque dentato-spinosa.—Folia  $2.65 \times 1.1$ ,  $2.5 \times 0.8$ , cellulæ  $\frac{1}{2}$  bracteæ  $3.1 \times 1.35$ ; perianthia  $3.25 \times 1.5^{\text{mm}}$ .

P. CRISPABILIS, Lindenb. Mapiri, alt. 5,000 ped. ♂ (No. 3,032).

PLAGIOCHILA (§ CRISTATÆ) BOLIVIANA, n. sp.

Dioica, flavicans, caule bipollicari, valido basi rhizomatoso, parce ramoso, ramisque flexuosis polyphyllis. Folia dense imbricata, distiche patentia, raro decurvo-secunda, prælate semi-ovata, truncato-3-5-(plerumque 4-) dentata, rarius rotundata; margine antico recurvo, subrecto, integerrimo, longissime decurrente; postico basi primum recto horizontali dein late rotundato integerrimo, cauli appresso vel sæpius cristato-recurvo, cetero margine paucidenticulata, dentibus parvis inæqualibus numero 10-15; cellulæ parvulæ subopacæ, pachydermes trigonis angularibus magnis. Foliola minuta, caule velata, polymorpha, nunc lineara bifida, nunc ad basin usque in lacinias 2-3 capillares fissa &c. Andræcia in medio ramo posita; bracteæ pluri-jugæ, foliis minores, julaceo-imbricatæ.—Folia  $2.3 \times 1.9$ ,  $1.8 \times 1.4$ , cellulæ  $\frac{1}{2}^{\text{mm}}$ .

Hab. Ad Yungas Boliviae alt. 6,000 ped. (No. 3,020). P. *punctualis*, G. Hep. Mex. 57. t. 10, huic similis differt colore viridis foliis longioribus et sat angustioribus, paulo magis dentatis, foliolis majoribus plurifidis.

P. ORBIGNYANA, Mont. Mapiri, alt. 5,000 ped. (No. 3,065) "In locis udis, ad radices Andium orientales loco, Moletto dicto, ad cortices arborum." (D'Orbigny).

LEIOSCYPHUS, Mitt.

L. SCHIZOSTOMUS, S. in Hep. Am. et And. 446. Yungas, alt. 4,000 ped. (No. 3,055). Etiam cum *Lejeunea filiformi* *Plagiochilis*que haud raro commixta.

LOPHOCOLEA, Dumort.

L. MURICATA, Nees. In *Lej. filiformi* (No. 3,069) rarissime repens.

L. TRAPEZOIDEA, Mont. Frustula sola inter *Plagiochilas* raro inventa.

LOPHOCOLEA QUADRIDENTATA, n. sp.

Dioica, luride purpurea, prostrata, caule pollicari vel longiore, vage paucirameo. Folia opposita, arctiuscule imbricata, hori-

zontalia, convexa, oblongo-quadrata apice truncato biapiculata, sinu lato recto vel parum lunato, margine antico stricto integerrimo, postico apicem versus leniter rotundato, ibidemque dentibus ciliisve 2 dissitis armato; dentibus omnibus 4, subæquidistantibus, subulato-setaceis, apicalibus 4 cellulas, lateralibus 7-9 cellulas longis; cellulæ medii folii majusculæ, subapicales duplo minores, omnes leptodermes pellucidæ. Foliola utrinque cum folio connata, profunde bifida, dein quadrifida, laciniis foliis plus duplo brevioribus, subulatis, flexuoso-acuminatis, divergentibus, integerrimis vel paucidentatis, laciniis 2 basalibus reflexis interdum adjectis. Flores ♀ in caule ramove terminales (juveniles). Bracteæ foliis validius dentatæ; bracteola maxima, primum bifida dein plurilaciniata laciniis subtortis. Pistillidia plurima subelongata. Perianthia —. Folia  $2.5 \times 1.8$ ; cellulæ  $\frac{1}{4}$ ; folioli laciniæ  $1.0^{\text{mm}}$ .

Hab. In Andibus Bolivianis, alt. circiter 6,000 pedum, ut videtur sat frequens, ad rupes humidas cum *Sphagnis*, *Plagiochilis*, etc. repens; solum sterilis visa—(No. 3,008, 3,074).—Ad ramos tenuiores dens quartus s. infimus interdum deest, et folium solum tridentatum fit, dentibus etiam abbreviatis.—A *Chiloscypho arguto*, N., insulis Malayanis etc. indigeno, quocum commutata fuit, tam generice quam specificè differt.

## JUNGERMANIA.

### JUNGERMANIA OPPOSITIFOLIA, n. sp.

Dioica, cæspitosa, inferne virescens, apice rosea; caules 1-2 pollicares graciles, subsimplices, subtus ad foliorum insertionem radicellis brevibus pallidis obsessi. Folia subimbricata, vel vix contigua, opposita nisi pro basi antica breviter decurrente fere transversa, assurgenti-secunda, laxè accumbentia, oblongo-orbiculata, leniter concava, integerrima, cellulæ parvulæ, subæquilateræ, facie tuberculoso-asperulæ, trigonis angularibus magnis. Foliola nulla. Flores — Folia  $.8 \times .65$ , cellulæ  $\frac{1}{10}^{\text{mm}}$ .

Hab. Bolivia, prov. Yungas (No. 3,045).—Folia plerumque exacte opposita, raro basi subconnata; solum in caulibus tenuioribus videntur folia superiora interdum subdislocata.—Cum *J. colorata* congruit habitu colore, &c.; multo tenuior tamen, foliis oppositis (nec alternis) minus decurrentibus, &c.

## NOTEROCLADA, Tayl.

### NOTEROCLADA ARHIZA, n. sp.

Dioica, virens, in ætate rubescens, caule 1- $\frac{1}{2}$  pollices longo,



subsimplice, in matrice arcte repente, prælato, tenui tamen, supra plano vel subdepresso, subtus vix convexulo et vel omnino arhizo vel raro e foliorum basi radicellas paucas minutas proferente. Folia plano-disticha, parum imbricata, succuba fere longitudinaliter inserta, inferiora latiora quam longa, ovato-rotunda, subapicalia paulo longiora et angustiora, oblique oblonga magisque erecta, omnia cellulis bistratis pro maiore parte (medio præcipue) conflata; cellulæ magnæ, pellucidæ, superiores subæquilatero, 4-7 gonæ, mediæ inferioresque oblongatæ. Flores ♀ terminales (valde juveniles solum visi).—Folia  $3.1 \times 3.8$ , superiora  $4.3 \times 2.8$ , cellulæ subapicales  $\frac{1}{8}$  mm.

Hab. Sorata alt. 10,000 ped., cum *Marchantia* mixta, sterilis. (No. 3,005 p.p.)—The few species previously known of this curious genus are notable for their numerous, long, thick radicles, in one species purple, in another white; but in this plant, which exactly accords with the other species in the character of its foliage, the stems are either entirely rootless or shew rarely one or two small fascicles of radicles reduced to mere papillæ.

#### SYMPHYOGYNA, Mont.

S. BRASILIENSIS, Mont. var. Yungas alt. 6,000 ped. (No. 3,059).—Specimens from South Brazil, and others from the Quitenian Andes, have the fronds mostly thin and unistratous nearly or quite up to the midrib; but in these of Dr. Rusby's, and others from the Antilles, the pagina is thickened for about half its breadth, 4 cells thick next the midrib, thence gradually thinning out; yet intermediate states occur. In color, the fronds vary from whitish-green to olive-purple—almost black on the midrib.

S. LEPTOTHELIA, Tayl.? Yungas, alt. 6,000 ped. (No. 3,007 a).

S. BRONGNIARTII, Mart. Frondes perpaucae steriles inter *Plagiochilas* visæ.

#### METZGERIA, Raddi.

M. HAMATA, Lindberg. Yungas, alt. 6,000 ped., fertilis. (No. 3,007 b).

#### ANEURA, Dumort.

A. (MULTIFIDÆ affinis, sterilis). Sorata, &c. (No. 3,005 p.p. &c.)

## DUMORTIERA, Nees.

D. HIRSUTA, N. var. IRRIGUA. Yungas, alt. 4,000 ped. (No. 3,006).

## MARCHANTIA, L.

M. PLICATA, Nees? Sorata, alt. 10,000 ped. (No. 3,005).

M. CHENOPODA, L. Pl. ♀ fertilis. Yungas 4,000 ped. (No. 3,004); pl. ♂ eodem loco, Nos. 3,001, 3,002, 3,003.

M. *nova species*? Sorata, sterilis, cum *Noteroclada*, (No. 3,005 ).

## AITONIA, Nees.

A. ? *species*, sterilis. Sorata, alt. 13,000 ped. (No. 3,000).

## FIMBRIARIA, Forst.

F. *species*, sterilis. Mapiri, alt. 5,000 ped. (No. 3,088).

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